DOCUMENT RESUME

ED 161 078 CS 204 473

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TITLE Miscue Analysis in Writing.
INSTITUTION Arizona State Univ., Tempe.
SPONS AGENCY National Council of Teachers of English, Urbana, Ill. Research Foundation.
PUB DATE [75]
NOTE 25p.; For related documents, see CS004443 and CS204472-475

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Elementary Education; Grade 4; Intermediate Grades; *Language Research; *Miscue Analysis; *Sentence Combining; *Writing Skills
IDENTIFIERS *Writing Miscues

ABSTRACT

Strategies used in the writing process by fourth grade students were studied by eliciting miscues in sentence combining writing samples. Following the procedure used by Goodman in the elicitation of miscues in reading, students were required to perform writing exercises slightly above their expected ability. Writing samples were collected from 9 boys and 16 girls over a four-month period, involving 30 minutes of class time for three class periods per week. Some of the results indicated that, of the miscues involving omission of a phrase or of members of a particular part of speech, the omission of nouns or noun phrases is the most frequent; the next most frequent is the omission of determiners. Analysis of miscues revealed individual differences in language processing and the possibility of two or three different styles of processing written linguistic forms. Examples of miscues made by the students are included. (MKM)

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Miscue Analysis in Writing[1]

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If indeed students are to be treated as individuals and if indeed instructional materials are to be devised to meet the individual needs of individual students, then it would appear that the strategies used by individuals in the writing process should be studied and these strategies should be compared with those of other individual students so that instructional materials and techniques can be designed to meet the needs of the individual student. With this in mind, the decision was made to elicit miscues in writing samples from fourth grade students in one class at Evans school in the Tempe district. These writing samples were collected over a four month period involving 30 minutes of class time for three class periods per week.

Elicitation Procedures

Following the procedure used by Goodman (1973: 7) in the elicitation of miscues in reading, students were required to perform exercises in writing slightly above their expected ability. In the day to day collection of miscues, the following procedure was followed. An experiment was established to aid students in

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their acquisition of the writing skill through sentence combining as described in previous experiments (O'Hare, 1973, Ney, 1975 and so on). In particular, the procedure used in the Ney experiments (Miller and Ney, 1968; Burruel, Gomez and Ney, 1974) was employed. This procedure included the following:

1. Establishment of context for language exercises through oral reading of literary selection.
2. Oral practice of sentence types using language from literary reading in step (1).
3. Writing of selected sentences from step (2).

(The schedule of sentence types practiced can be seen in Table 1; with few exceptions, these sentences occur very infrequently in the writing of fourth graders. (See Hunt 1965).) One deviation from the preceding experiments was made in the presentation of the exercises for written work. Normally, in the previous experiment, only sentences of a given syntactic type were practiced either orally or in writing at a given session. Since one of the aims of the project reported here was to gather miscues, a tactic was systematically used to engender miscues in the student writing. This tactic was pursued as follows: in every ten sentences which were practiced orally (three of which were later written), one sentence deviated slightly in structure from the remainder of the sentences. Those sentences which follow the expected pattern for the day were designated the paradigmatic sentences; the one which did not was designated the contra-paradigmatic sentence.

Thus, for example, the students might be practicing object to object embedding of sentences with relative clauses as in sentence (1). In the middle of the exercise, or at some other propitious point, a contra-paradigmatic sentence would be inserted such as sentence (2), in this case, a sentence which requires object to subject embedding.

1. He met a young man. Input sentence (1).
   He spoke to the young man. Input sentence (2).
   He met a young man whom he spoke to. Resultant sentence.
2. The man was handsome. Input sentence (1).
   He liked the man. Input sentence (2).
   The man whom he liked was handsome. Resultant sentence.

In the exercise including the above examples, at most four students out of nineteen miscued on the paradigmatic sentences. All of the students miscued on the contra-paradigmatic sentence producing the following resultant sentences:

3. The man was handsome whom he liked. (12 students)
4. He liked the man who was handsome. (4 students)
5. He liked the handsome young man. (1 student)
6. The man who was handsome he liked. (2 students)

Now, it is apparent from the miscue sentences in (3) through (6) that not all of the sentences thus formed are ungrammatical. Nevertheless these are all treated as miscues in an attempt to determine

if in fact some students process oral language into written language in a discernible manner.

Since miscues such as the above are an artifact of the manner in which they are gathered, these are designated as artifactual miscues. Not all of the miscues, however, are of this nature. Some of the miscues seem to be a result of the manner in which students process language when they write down oral language. (For a discussion of student processing of oral language into written language, see Ney (1974).) Miscues of this nature are designated processing errors such as the one in sentence (7).

7. Plagued by arthritis couldn't walk home.

(Plagued by arthritis, the old man couldn't walk home.)

Here, it is supposed that for an instant the student held the noun phrase subject, the old man, in mind but as the sentence was being processed the subject noun phrase was dropped from mind before it could be recorded on paper. (See Mellon, 1969, p. 24.) Still other miscues are a result of the student's stage of linguistic development such as the miscue in sentence (8).

8. The money was sa[illegible], kepted in the bank.

(The money was safe, kept in the bank.)

In addition to these, all of the spelling miscues were collected to see if in fact the type of miscues that a student makes in spelling has any relationship to any of the miscues made in other aspects of the students' writing.

After each session, the miscues were recorded for punching on IBM cards. A concordance routine with counter and frequency subroutines was then employed to (1) bring the work of individual students together, (2) compute the frequency of words involving miscues, and (3) group all spelling miscues. In all, over 900 sentences out of an estimated 3600 sentences contained miscues involving 6784 words with miscues. Spelling miscues were for the most part counted singularly and not in a full sentence.

Discussion of the miscues

In the first place, it might be pointed out that making a distinction between artifactual, processing and developmental miscues is difficult because the linguistic capability of ten-year-olds is not known completely. It could be argued that structures not found in the Hunt study (1965) and miscues involving them must in fact be due to the linguistic development of the students and must therefore be developmental miscues. This is not necessarily the case. Hunt, for instance, does not find series of three adjectives or conjoined adjectives in the noun phrases of the writing of fourth graders. In a previous study, Ney (1975), it was reported that fourth graders were not developmentally ready for conjoined adjectives. In the studies underlying that report, adjectives in series were always introduced before the conjoined adjectives. In the study underlying this report, conjoined adjectives were introduced before adjectives in series with the

result that students had little trouble with the conjoined adjectives, but when they were required to produce adjectives in series, they miscued, producing conjoined adjectives instead. Thus, what appeared to be a developmental miscue turned out to be an artifactual miscue, an artifact of the method used to elicit the written language which was subsequently studied.

In spite of this difficulty, an attempt was made to classify miscues into artifactual, processing and developmental miscues. Thus all of the instances of the omission of the past tense marker -ed were classified as developmental as were the uses of whom for who or who for which. After studying them closely, it was decided that all of the pleonastic uses of forms were artifactual as were the various inversions. In a similar manner, it was decided that all of the omission-of-forms miscues were processing errors. With this breakdown, processing errors constituted 49.7 % of the total, artifactual 30.6 % of the miscues and developmental miscues accounted for 19.6 % of the total of the miscues that could be so categorized. All other miscues were assigned to a miscellaneous category.

On the belief that there might be some relationship between the manner in which students process letters in the spelling of words and the manner in which they process linguistic units on other levels, a detailed analysis was made of spelling miscues in the following fashion: (1) spelling miscues were separated into the miscues of metathesizers and all other miscues. Metathesiezer miscues were grouped into four categories: (i) vowel left, consonant right: e.g. barve 'brave'; (ii) vowel right - consonant left, nosiy 'noisy'; (iii) vowel metathesis, biult 'built'; consonant methathesis, caml 'calm'. As a whole, metathesis miscues in spelling are not very common; they can nevertheless be seen tabulated in Table II.

Table II: Metathesis in Spelling Miscues

Vowel left Consonant right	Vowel right Consonant left	Vowel	Consonant	Total
7	18	28	10	63

All other spelling miscues were divided into three categories: additions, omissions and substitutions. Each of these were further divided into two categories for their involvement with either vowels or consonants in the following fashion: (i) additions - vowels, changeing, 'changing'; (ii) additions - consonants, whithe, 'white'; (iii) omissions - vowels, becuse, 'because'; (iv) omissions, consonants, straigh 'straight'; (v) substitutions - vowels, surved,

'served' (vi) substitutions - consonants, death, 'deaf'. In this type of analysis, some items would have more than one miscue, for example, ocsen, 'ocean,' has one consonant addition involving the 's' and one vowel omission involving the 'a'. (Here, vowel should be understood as vowel letter and consonant as consonant letter.) In this analysis, the spelling miscues involving addition, omission and substitution are as follows: (See Table III).

Table III: Additions, Ommissions and Substitutions in Spelling Miscues

Additions		Omissions		Substitutions		Total
Vowels	Consonants	Vowels	Consonants	Vowels	Consonants	
Boys						
16	18	38	56	36	34	198
Girls						
29	28	43	56	33	36	225
Avg. Boys						
1.7	2	4.2	6.2	4	3.7	3.6
Avg Girls						
1.8	1.5	2.7	3.5	2.1	2.3	2.3
Total						
45	46	81	112	69	70	423

The above analysis forces neglect of some interesting facts about miscues in spelling; for instance, when a student uses witch for which or bear for bare, that student is selecting spellings on the basis of underlying homophonous forms resulting in the choice of the wrong graphic form. This fact is obscured by the above but, on the other hand, it is interesting to note that the 9 boys in this study were not as good spellers as the 16 girls. (Compare the average of 3.6 miscues for the semester for the boys against 2.3 for the girls -- this difference did not show up in the metathesized spellings; hence, it is not recorded in Table II.)

It is also interesting to note that the big difference between the spelling miscues of boys and that of girls occurs largely in the area of omissions and substitutions.

All other miscues in the writing of the students can be grouped into omissions, pleonasms and substitutions. It should be understood that this kind of grouping does not exclude process statements which are so popular in linguistic studies today. An omission can be the failure to use a particular transformation and a substitution can be the use of one transformation in place of another. In any case, it is interesting to note that, of the miscues involving omission of members of a particular part of speech or of a phrase, the omissions of nouns or noun phrases are the most frequent. This becomes apparent from a perusal of Table IV.

Table IV: Miscues Involving Omission of Members of a Particular Part of Speech or of a Phrase

Nouns or Noun Phrases	Verbs or Verb Phrases	Adj-ectives	Adverbs	Prep-ositions	Conj-unctions	Determiners
81	18	16	7	11	8	24

Now, it is interesting that nouns, noun phrases and determiners are more frequently omitted from written language processed from oral input than members of any other form class. If in fact sentences are stored in their long term semantic dimension with some sort of a tag indicating the syntactic form in which they will receive surface manifestion (See Walter, 1973 or Ney, 1974), the findings in Table IV might be used to support the argument for the correctness of a Fillmore-type case grammar. The verbs or verb phrases being more central to the sentence than the nouns or noun phrases (predicates versus arguments) are retained longer and reproduced more exactly than the nouns and noun phrases. (The low incidence of miscues involving adverbs is due undoubtedly to the infrequency with which they are used in the corpus -- this explanation could be used for adjectives and conjunctions but probably not for prepositons.)

In any case, the environments in which miscues involving the omission of nouns and noun phrases occurred are extremely interesting. For instance, all cases of the omission of an entire noun phrase

occurred in the processing of underlying sentences which resulted in sentences such as (9) and (10).

9. Frightened by the thief, _____ ran home. (10)

   Frightened by _____, the boy ran home. (1)

   (Frightened by the thief, the boy ran home.)

10. runing away _____ didn't look back. (3)

    (Running away, the cat didn't look back.)

In all of these instances, a sentence element derived from an underlying relative clause opens these sentences in a way unfamiliar to most ten and eleven year olds. Furthermore, in example (9), this opening sentence element brings two noun phrases into close association. It might be that either of these factors contributed to the occurrence of miscues.

It is also interesting that out of 39 instances in which the noun alone is missing 19 occur directly following the definite article as in (11) and 14 occur directly after adjectives as in (12).

11. The which was now dead was mean.

    (The dog which was now dead had been mean.)

    (Frightened by the thief, the boy ran home.)

12. The bright young visited the city.

    (The bright young boy visited the city.)

In all of these instances the students seem to have a penchant for dropping the noun out of definite noun phrases. The remainder of the omissions of noun phrases center on the omission of the pronouns (27 instances).

Examples are divided into the omission of relative pronouns resulting in a grammatically well-formed sentence (12.i) and those resulting in grammatically mal-formed sentences (12.ii) and the omission of the personal pronouns (12.iii).

(12.i) The medicine he put on the scar was very strong.

(The medicine which he put on the scar was very strong.)

(12.ii) The elephant was big and dirty came down the road.

(The elephant which was big and dirty came down the road.)

(12.iii) The medicine put on was very strong.

(The medicine which he put on was very strong.)

In all, these miscues account for 16 instances with relative pronouns and 11 instances with personal pronouns.

Of the miscues involving omissions, the next most frequent are the omissions of the determiners which accounted for 24 miscues. Only two of these involved the indefinite article a/an; the remainder were all instances of the omission of the definite determiner, the. Of these, only three miscues of omission were caused by the omission of the in subject position as in (13).

13. Man who prayed a lot got tired.

(The man who prayed a lot got tired.)

Most cases of the omission of the in object position are in clearly statable environments such as (a) with the use of gerundive modifiers in prenominal position (14), (b) preceding nouns which in turn were followed by relative clauses (15), or (c) preceding nouns that had conjoined adjectives embedded in prenominal position (16):

14. The rabbit liked quickly thinking coyote.

    (The rabbit liked the quickly thinking coyote.)

15. Rip served chief who was weather-beaten.

    (Rip served the chief who was weather-beaten.)

16. The laughed at quiet and considerated man.

    (They laughed at the quiet and considerate man.)

(All but one of the instances like (15) were the work of two students.) In any case, it would seem from the above that most of the miscues involving omission of the determiner the occur when students are grappling with material that is structurally complex. The same can be said for the omission of the indefinite determiner a/an. This type of miscue occurs only preceding single (17), or conjoined adjectives (18).

17. The man carried heavy keg.

    (The man carried a heavy keg.)

18. The wolf was strong and brave dog.

(Wolf was a strong and brave dog.)

In all of these cases, it appears that the processing capability of the students was overtaxed and that they missed dropping out the determiners. So it is that the miscues involving the omission of nouns, noun phrases and determiners constitute the largest single group of miscues, well over 100.

In contrast to this, miscues involving the omission of the verb alone or of the entire verb phrase occured only 18 times in the data under discussion. These involved omission of the verb alone (19) or of the verb phrase (20).

19. The man a heavy keg.

(The man carried a heavy keg.)

He into a dark forest.

(He went into a dark forest.)

20. The girl who was weak thin and sickly.

(The girl who was weak thin and sickly couldn't move.)

A thin man speaking about elections.

(A thin man speaking about elections gave him a handbill.)

It is hypothesized here that the reason that students miscue on the verb and the verb phrase so less frequently than they do on the noun phrase is that the verb is more central to the semantic storage in the long term memory than the noun. Thus students tend not to omit the verb as frequently as the noun (Walter, 1973).

The omission of adjectives (16 instances) (21), adverbs (7 instances) (22), prepositions (11 instances) (23) and conjunctions (8 instances) (23) all account for fewer miscues.

(21) The crowd which was growing became.

(The crowd which was growing became big.)

Rover found the bone wich was big and bare.

(Rover found the bone which was big, white and bare.)

(22) The village built long had become old.

(The village built long ago had become old.)

When he put his tongue he tasted gravy.

(When he put out his tongue, he tasted gravy.)

(23) The sentence repeated the boy didn't make sense. (The sentence repeated by the boy didn't make sense.)

(24) Bug was a handsome young dog.

(Bug was a handsome and young dog.)

The boy brave smart looked at the bucket.

(The boy, brave and smart, looked at the bucket.)

(Other prepositions omitted were: to, at, and about.)

The omission of the auxiliary and be as a main verb accounted for a total of only seven miscues. Two of these were in the writing of an Afro-American student.

(25) The suddents divided in Groops which different.

(The students divided into groups which were different.)

The remainder occurred in the passive (26).

(26) The dog which owned by the boy had no name.

(The dog which was owned by the boy had no name.)

Pleonastic uses of the members of various form classes occurred less frequently than the omission of members of form classes (52 versus 185). They nevertheless indicated as wide a range in type. For instance, one of these involved what is commonly considered to be a pleonastic personal pronoun.

(26) The dog he was brave and strong.

The remainder seem to be largely caused by processing errors in which students do not delete the underlying noun or personal pronoun in the relative clause rule.

(27) The students had a plan which the plan was dandy.

(The students had a plan which was dandy.)

He loved the dog which he wanted it.

(He loved the dog which he wanted.)

The boy whom won the contest he hated the man.

(The boy who won the contest hated the man.)

Of the 52 instances of pleonastic forms in miscues, 31 of them are nouns, noun phrases or pronouns as in the above. No verbs verb phrases or adjectives occurred in this section although adverbs did (3 instances) as did conjunctions (7 instances) and prepositions (2 instances) as in the following (28-30).

(28) The slowly walking slowly chief arivide late.

(The slowly walking chief arrived late.)

The nine pines falling over over sounded like thunder.

(The nine pins falling over sounded like thunder.)

(29) The old woman comeing forward studied at his face.

(The old woman coming forward studied his face.)

(30) The young and bright boy visited the city.

(The bright young boy visited the city.)

(All miscues involving conjunctions were of the nature of (30). It is interesting again that of the miscues involving pleonastic forms, the majority are involved with nouns and noun phrases.

In a rather strange reversal, the most numerous cases in which one word is used for another in a form class involve verbs although these are not so numerous (8 instances).

(31) The snake look at the fast moving rabbit.

(The snake watched the fast moving rabbit.)

Davy didn't think thinking about the raccoon.

(Davy didn't move thinking about the raccoon.)

One whole series of miscues deals with the inversion of clauses and of sentence elements. For instance, some students are double inverters, exchanging two sentence elements within the sentence as in the following:

(32) i The fast moving rabbit watched the snake.
(The snake watched the fast moving rabbit.)

ii The mule which he wanted cost a lot.
(He wanted the mule which cost a lot.)

Other students are right embedders, shifting to the right a sentence element which was supposed to be embedded to the left (center embedding).

(33) Scarface liked the young man whom welcomed him.

(The young men whom Scareface liked welcomed him.)

The mule cost a lot which he wanted.

(The mule which he wanted cost a lot.)

Still others are left embedders, shifting to the left a sentence element which was supposed to be to the right (sentence final position).

(34) The man who was handsome he liked.

(He liked the man who was handsome.)

Others still are dodgers; they prefer not to follow the stated activity for the day, substituting for it some other strategy.

(35) He liked the handsome young man.

(The man whom he liked was handsome.)

Now, at this point, it is difficult to classify a student as fitting entirely into one category or another. All students who miscue in the writing tasks herein described tend at one time or another to be involved in each one of the miscues thus far described. Some students, however, are involved proportionately more than others in any given miscues. It is to these individual students that the discussion now turns.

Discussion of the Miscues of Individual Students

Of the twelve students that were involved with the greatest number of miscues in the study, eight of them omit a greater number of consonants than vowels in the spelling miscues and also omit a fair number of nouns and noun phrases while on the other hand avoid-

ing the required center embedding. Bar graphs representing their miscue scores can be seen to the left in Table V.

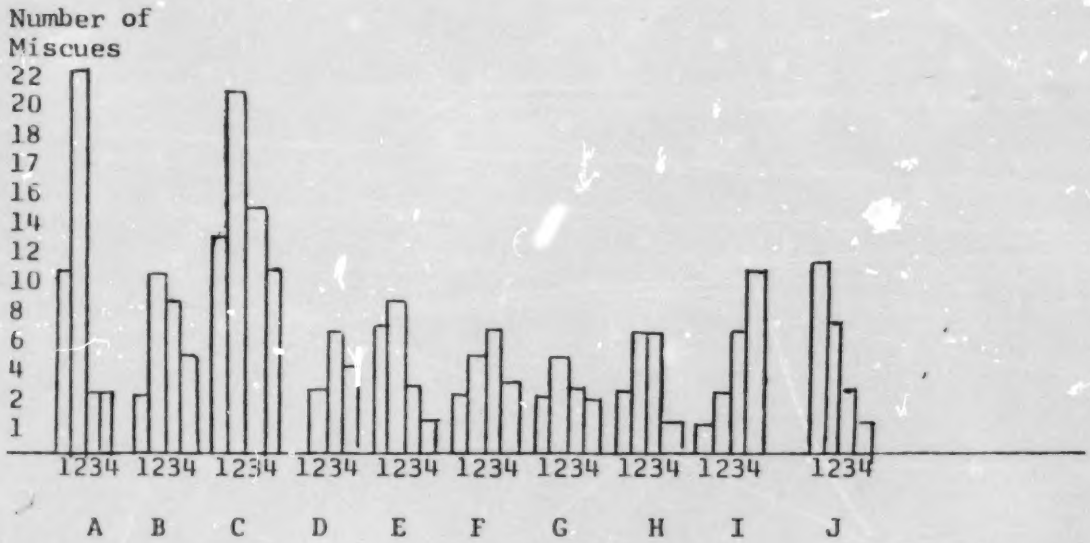

Table V: Profiles of selected students on some miscues.

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1 - omission of vowel in spelling; 2- omission of consonant in spelling; 3 - omission of noun or noun phrase; 4 - avoidance of center embedding.

Now it is interesting that the profiles of the scores for eight of the students (A through H) exhibit a clearly discernible pattern, suggesting that they are processing written language in a particular fashion. Students (I) and (J), however, seem to be processing language in a manner quite different from that of their peers. Student (I) has an inordinate number of miscues caused by the fact that he is a right embedder (avoidance of center embedding) and a paucity of errors in spelling caused by omission of either vowels or consonants. Student (J), however, exhibits a pattern quite the reverse of this, making very few miscues as a result of avoiding center embedding but making a

disproportionate number of miscues in the omission of vowels and consonants in spelling. Whether, in fact, this study has thus indentified two or three different styles of processing written linguistic forms or not is probably yet not certain. But it has raised the possibility that this might be true.

Similar phenomena have come to light. For instance, one of the best students who miscued only nine times during the entire semester was involved in five spelling miscues and four miscues of other types, and of these four, all of them involved the omission of nouns or noun phrases. Another example can be drawn from a student who was responsible for all of the double inversions except one. The student, subject A in Table IV, who produced the most miscues, very seldom omitted a past tense marker while another student who produced only half as many miscues omitted the past tense marker with regularity.

Classroom implications

At this point, classroom implications are less than obvious. From a study of the data in this study, some rather vague suggestions can be made, however.

1. In the teaching of writing, the differing styles that young students use to process written language will have to be identified. Hopefully, easy to use measures can be developed for this identification process.

2. Teaching strategies will have to be developed to aid the students in the improvement of their individual styles of processing written language.

From the viewpoint of this observer, two different responses can be made under item (2): (i) programs can be developed to focus on the individual miscues of individual students, and (ii) rather general strategies can be employed which tend to aid the students in all areas of processing written language. Of the two approaches, the latter most appeals to this observer. Response (i) reduces teachers to the level of miscue correctors. Response (ii) enables teachers to address themselves to a fairly large group of students without neglecting individual differences. O'Hare has already found that practice in one area of language processing aids the student in another (1973: 72) as has Steadman (1971) who has found that a technique to aid students in writing has helped some of them at least improve their reading.

Table 1: Schedule of Sentence Types Practiced

Structure		
Adjectives		
Single	He didn't like difficult work.	1,4
In WH-clauses	...the tree which was large.	3,5,6,11,23
Conjoined		
Prenominal	The tired and hungry man couldn't...	21,23
Postnominal	The man, tired and hungry...	20
In WH-clauses	The man, who was tired and hungry	23
In triple series	He listened to the lonely, tired and unhappy man.	30,31
In WH-clauses	The men, who were blind and poor...	19
In Series	They sat through the long lazy days of summer.	2,26
In WH-clauses		
ING-phrases		
Prenominal	He watched the quietly purring cat.	22,29.
Postnominal	The children, running with him, ...	9,12
In WH-clauses	The man, who was entering the...	8
As Sentence Modifier	Running with him, the children entered the village.	10,13
Cumulative	...entered the village, running with him.	14
In WH-Clauses		
EN-Phrases		
Prenominal	...the badly broken foot.	18,29
Postnominal	The village, built long ago...	16
In WH-clauses	The mule, which was owned by...	15
As Sentence Modifier		
Cumulative	The village had become old, built long ago.	17
Non-adjectival clauses		
Object to object	She talked to the man whom she had met.	25
Object to subject	The life which they lived was very long.	27,28

[1]This research was completed with the aid of a grant from the Research Foundation of The National Council of Teachers of English.

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